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TOO MUCH KNOWLEDGE FOR A NURSE? USE OF PHYSICAL ASSESSMENT BY FINAL-SEMESTER NURSING STUDENTS

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ABSTRACT

There is debate around the scope of physical assessment skills that should be taught in undergraduate nursing programs. Yet this debate is largely uninformed by evidence on what is learned and practiced by nursing students. This study examined the pattern and correlates of physical assessment skill utilization by 208 graduating nursing students at an Australian university, including measures of knowledge, frequency of use and perceived barriers to physical assessment skills during clinical practice. Of the 126 skills surveyed, on average only five were used every time students practiced. Core skills reflected inspection or general observation of the patient; none involved complex palpation, percussion or auscultation. Skill utilization was also shaped by specialty area. Most skills (70%) were, on average, never performed or learned and students perceived nursing physical assessment was marginalized in both university and workplace contexts. Lack of confidence was thus a significant barrier to use of skills. Based on these findings we argue that the current debate must shift to how we might best support students to integrate comprehensive physical assessment into nursing practice.

Keywords: Nurse education, nursing assessment, nursing students, patient assessment, physical assessment, physical examination.

INTRODUCTION

The use of physical assessment by nurses has historically troubled the profession. As Sandelowski (2000) has argued, although skilled observation has defined and legitimized nursing practice, just how much knowledge and skill is appropriate for a nurse to perform physical assessment has been much debated. Contemporary views suggest that this issue remains unresolved and concerns about the legitimacy of physical assessment by nurses are still prominent (Lesa & Dixon, 2007). More recently the debate has shifted to whether nursing education is meeting the needs of industry and which skills are relevant to nursing practice (Fennessey & Wittmann-Price, 2011). Zambas (2010) goes further to argue that systematic physical assessment has become a 'sacred cow' in nursing education because in practice it diverts the nurse's attention away from the patient's illness experience. The purpose of this study was to contribute to the current debate around the extent of physical assessment skills taught in undergraduate nursing programs by examining the pattern and correlates of skill utilisation among graduating nurses.

LITERATURE REVIEW

Despite broad agreement that physical assessment is an essential competency for registered nurses (RNs) (Fennessey & Wittmann-Price, 2011), a growing body of literature argues that nurse academics are teaching too much in this area. Secrest, Norwood and DuMont's (2005) study is often cited in support of reducing content. These authors administered a 120-item survey of physical assessment skills found in nursing textbooks to 12 educators and 51 practicing nurses purposively sampled from seven states in the US. The results showed that although 92.5% of skills were taught and practiced in nursing degree programs, only 29% of the skills were used on a daily or weekly basis by nurses. Although limited by a small convenience sample, based on this finding, Secrest and colleagues urged nurse educators to reevaluate physical assessment course content and to focus on "what

nurses need to know to practice nursing" (p. 114). It was suggested that the growing number of physical assessment skills taught to nurses was problematic because it reflected a deeply entrenched medical model in nursing education. A reduction of content was thus argued on philosophical grounds. Nurses, it was proposed, use physical assessment in ways that differ from medicine and so discipline-specific knowledge was needed to identify nursing's unique contribution to health assessment.

Giddens' (2007) research has also been influential. This survey of 193 RNs working in a large university-based healthcare facility in south-western US found that only 30 out of 126 physical assessment skills assessed were reported to be routinely performed. The remaining skills were performed occasionally or not at all. A secondary data analysis comparing 48 associate degree and 48 bachelor degree prepared RNs matched by clinical area and years of experience also found that frequency of physical examinations did not differ by educational preparation or years of experience (Giddens, 2006). Based on these findings, Giddens and Eddy (2009) surveyed 198 faculty from across the US to determine the physical assessment content taught in undergraduate nursing programs. They found that of the 122 skills included on the survey, 81% were reportedly taught in most programs. In raising concerns about content saturation in nursing programs and an apparent disconnect between education and practice, Giddens and Eddy (2009) again urged nurse educators to consider teaching fewer skills and revising course expectations for entry-level nursing practice.

Based on the above studies, other investigators have focused on reducing the physical assessment content in undergraduate nursing programs. Shinozaki and Yamauchi's (2009) delphi study, for example, sought consensus among clinical nurses and educators on the minimum respiratory physical assessment skills to be taught if there was a 60% reduction in lecture content. Another study reported an "evidence-based approach" to undergraduate physical assessment course development by administering Giddens' (2007) survey to RNs to

determine if skills used by nurses matched what was taught in their program (Anderson *et al*., 2014). Despite a poor response rate and small sample size ($N = 72$) and based on the 29% of skills found to be routinely performed by RNs, the authors reported that the remaining skills were no longer discussed, demonstrated or practiced during the practicum course (Anderson *et al*., 2014).

By contrast, Birks *et al.* (2013a) take a more moderate perspective on the teaching of physical assessment. Their study of 1220 Australian nurses, using Giddens' (2007) survey of physical assessment skills, found only 34% of skills were routinely used in practice. Many skills had been learnt by nurses but never performed (35.5%), or used rarely (31%), in clinical practice. However, in contrast to Giddens' work, the survey also elicited comments by nurses that skill utilization was influenced by lack of time available to complete assessments, area of clinical practice or specialty and the presence or absence of other health care workers such as medical and allied health staff. Based on these findings, Birks *et al*. argued that the relevance of each skill appears to have little bearing on the frequency of use by nurses and further research was needed to explore the barriers to physical assessment.

These same researchers recently replicated Giddens and Eddy's (2009) study with 53 Australian nurse academics who teach physical assessment (Birks *et al.*, 2013b). They similarly found that of the 121 skills included, 81% were commonly taught in pre-registration programs; 57% with student practice and 24% without. Half of the skills surveyed were taught by more than 80% of nurse academics and 23 skills were taught by more than 90%. Yet, rather than argue that skills used infrequently in practice should be eliminated from the curriculum, Birks *et al*. suggest the need for alternative approaches to teaching core skills. This reflects contemporary approaches to teaching physical assessment in medicine which emphasize a hypothesis-driven or focused approach that includes selective physical

assessment based on clinical reasoning rather than following a routine comprehensive physical examination (Benbassat *et al.*, 2005; Yudkowsky *et al.*, 2006).

Given the debate surrounding this issue, surprisingly few studies have examined nursing students' use of physical assessment skills. An early study by Schare, Gilman, Adams and Albright (1988) found relatively low skill utilization by second-year bachelor of nursing students following a physical assessment course. Students mostly used inspection and where body systems were assessed, only skin assessment was frequently conducted. Pre and post measures of attitudes towards health assessment showed a significant positive change, which also correlated positively with skill usage (Schare *et al*., 1988). A decade later, a survey of undergraduate nursing students in the US found that fewer than half the skills taught in a physical assessment course were used in clinical practice (Barbarito *et al*., 1997). Although the available evidence is limited, it raises questions about nursing education and practice in relation to the use of physical assessment during clinical placements.

Few studies have examined nurses' attitudes and perceived barriers to use of physical assessment skills (Douglas *et al*., 2014) and even fewer among nursing students. Sony (1992) surveyed 114 bachelor prepared nurse graduates to examine barriers to the use of skills in practice after a comprehensive physical assessment course during their program. While more than 50% of the graduates reported using all 42 skills examined, reasons for skills not used were primarily because the physician carried them out or they were seen as inappropriate to the clinical setting. Another study found that third year nursing students were more comfortable performing peer and patient physical assessment than first year students (Wearn *et al*., 2013). Yet, limited data are available to draw conclusions about the factors that influence nursing students' use of physical assessment.

In summary, the nursing literature raises some interesting questions about the scope and relevance of physical assessment in education and practice. Despite ongoing debate, little

is known about the use of physical assessment by undergraduate nurses. Based on the questions raised by previous research about the content of physical assessment taught in nursing programs, we sought to test the assumption that nursing students learn and practice physical assessment skills during their degree that do not translate to clinical practice.

STUDY AIM

The aim of this study was to examine the pattern and correlates of physical assessment skill utilization by final-semester nursing students. The major research questions were: (1) What physical assessment skills do final-semester student nurses perform during clinical practice? (2) What are the perceived barriers to student nurses' use of physical assessment skills?

METHODS

Design

A cross-sectional survey design was used.

Sample

Participants were recruited from a convenience sample of Bachelor of Nursing students in their final semester at a multi-campus Australian university. The accessible population included 654 students enrolled in a capstone unit during 2013. Students were recruited, following a four week clinical placement at the beginning of the semester, via their student email account using a generic course code email address. The email contained participant information and a link to complete an anonymous online survey. To increase the response rate three reminder emails were sent at two week intervals and there was an option to enter a random draw to win a tablet computer.

Data collection

The online survey was conducted over two semesters, between April and November 2013. It was created using Key Survey software and given the number of questions took

approximately 30 minutes to complete. Demographic data included students' gender, age, whether English was spoken as a second language, nationality (domestic or international), and entry status to the Bachelor of Nursing (3-year undergraduate entry, 2-year graduate entry, or 2-year diploma of nursing/enrolled nurse entry).

Physical Assessment Skills. We measured students' knowledge and frequency of use of physical assessment during clinical placement using Giddens' (2007) 126-item survey of physical examination techniques. It incorporated assessment skills beyond normal vital signs including inspection, palpation, percussion and auscultation, divided into 15 body regions/systems: integument, nutrition, head, ears, eyes, neck, thorax, breasts, back/spine, cardiovascular, musculoskeletal, abdomen, genitalia/reproductive (female and male), anus/rectum/prostate, and neurologic (central nervous system, cerebellar function, sensory function) assessment. Respondents were asked to indicate the average frequency with which they performed each skill using a 6-point scale: 0 = *I do not know how* to do this skill, 1 = *I know how* to do this skill, but have *never* done this in my clinical practice, 2 = I perform this skill *rarely* (a few times during my degree), 3 = I perform this skill *occasionally* (a few times each clinical placement), 4 = I perform this skill *frequently* in my clinical practice (almost every time I work), 5 = I perform this skill *regularly* in my clinical practice (every time I work). We slightly modified the response scale to refer to clinical placements rather than clinical experience for use with nursing students (e.g., "a few times during my career" was changed to "a few times during my degree").

There is a lack of validated and standardized measures of physical assessment skills in the literature (Fennessey & Wittmann-Price, 2011). We selected Giddens' (2007) survey of physical examination techniques to enable comparisons with previous studies and because it has been modified for use in the Australian context (Birks *et al*., 2013a). It was originally

developed based on a review of undergraduate nursing assessment textbooks and demonstrated adequate face and content validity (Giddens, 2007).

Barriers to Physical Assessment. Student perceptions of barriers to physical assessment were examined using the 38-item Barriers to Nurses' use of Physical Assessment Scale (Douglas *et al*., 2014). It has seven subscales including: reliance on others and technology, lack of time and interruptions, ward culture, lack of confidence, lack of nursing role models, lack of influence on patient care, and specialty area. Respondents were asked to indicate the extent to which they agreed each statement applied to their practice on a 5-point Likert-type scale (1 = *strongly disagree*, 5 = *strongly agree*). Each subscale was scored by averaging the items, with higher scores indicating greater perception of barriers to physical assessment.

The Barriers to Nurses' use of Physical Assessment Scale was recently developed and validated with a sample of Australian acute care nurses (Douglas *et al*., 2014). In the current sample, factor analysis replicated a seven-factor structure and the internal consistency of subscales ranged from .73 to .88.

Open-ended Question. An open-ended question that asked for comments about barriers to nurses' use of physical assessment skills was posed at the end of the survey.

Ethical considerations

Study procedures were approved by the Queensland University of Technology Human Research Ethics Committee. Ethical considerations protected students' interests and ensured voluntary participation. A research assistant, who was independent of the capstone unit, explained the purpose of the study during class time. Study information also emphasized that a decision to participate would not affect a relationship with the University or grades in any unit.

Data analysis

Data were imported into IBM SPSS Statistics version 21 (IBM Corporation, Armonk, NY, USA) for analysis. Descriptive statistics were used to summarize the sample characteristics and to examine the use of physical assessment and perceived barriers. Given the ordinal measurement of skill utilization and following Giddens (2007) and Birks *et al*. (2013a), we calculated the median frequency for each physical assessment skill and considered those with a median and mode of 4 or 5 as core skills, reflecting skills used regularly or frequently by nursing students as a group during clinical placement. Because the distribution of the number of core skills used by students was skewed, in order to examine the correlates of core skill utilization, we first had to normalize this variable using a square root transformation. Associations between student characteristics and use of physical assessment skills or perceived barriers were then examined using *t*-tests and ANOVAs. Finally, the relationships between perceived barriers and use of physical assessment were explored using Pearson's correlations. A p value < .05 was considered significant for all analyses.

Qualitative data were deductively coded around the analytic focus of physical assessment skills and perceived barriers to physical assessment. The analysis generated insight into student nurse perceptions of nursing work and knowledge around the practice of physical assessment.

RESULTS

Sample characteristics

A total of 239 students completed the online survey, yielding a response rate of 36.5%. Of these, 31 cases were excluded from analysis due to greater than 10% missing data on the study measures or a pattern of attrition towards the end of the survey. The final sample included 208 final-semester nursing students ranging in age from 19 to 55 (M = 27.8, SD = 7.9 years). The majority were women (89.4%) and domestic students (74.0%), although

43.3% spoke English as a second language. Of the three Bachelor of Nursing degree entry pathways, 61.5% were completing the traditional 3-year undergraduate program, 27.4% were 2-year graduate entry students, and 11.1% were 2-year diploma of nursing/enrolled nurse entry. When asked to indicate which practice areas best described their third-year clinical placements, critical care/emergency (45.7%), medical (23.6%), surgical (23.1%), mixed medical-surgical (17.3%) and perioperative (19.7%) were the most common responses.

What physical assessment skills do final-semester student nurses perform during clinical practice?

Table 1 presents the overall frequency of use of physical assessment skills for the whole sample ranked by median scores. As a group, only five skills were used on average every time the respondents practiced: evaluate breathing effort, palpate and inspect capillary refill, palpate extremities for temperature, assess mental status/level of consciousness, and Glasgow Coma Scale. Fifteen core skills (12%) were identified by the sample and of these, cardiovascular and neurological assessment were most common. Beyond palpation of the extremities, all skills related to inspection or general observation of the patient. None involved complex palpation, percussion or auscultation techniques.

There were 23 skills (18%) with a median score of 3 or 2, indicating that they were performed by the sample occasionally or rarely over the duration of the degree. These included predominately musculoskeletal and head, ears and eyes assessment, and more complex chest and abdominal assessment skills. Students auscultated bowel sounds on average a few times each clinical placement, but rarely palpated the abdomen for tenderness or distension. They occasionally inspected the chest, but rarely performed chest palpation or auscultation, or assessed neck veins over the duration of their degree.

The overall pattern of findings showed that the majority of physical assessment skills surveyed (70%) were on average never performed in clinical practice or learned by nursing

students during their degree. Fifty-three skills (42%) had a median score of 1, meaning they were learned but never practiced. These included more comprehensive head, ears, eyes, and neck, thorax/respiratory, breast, back/spine, cardiovascular, abdomen, genitalia/reproductive and neurological examinations. Thirty-five skills (28%) had a median score of 0, meaning that students did not know how to perform these skills.

When we examined associations between student characteristics and the number of core physical assessment skills reported, we found frequency of skill utilization did not differ by gender, age, language or nationality. However, students completing the 2-year enrolled nurse entry degree used more core skills (M = 37, 95% CI = 23, 50), compared to both the 2-year graduate entry (M = 20, 95% CI = 17, 23) and 3-year degree (M = 23, 95% CI = 20, 26) student cohorts, $F(2, 206) = 5.40$, $p = .005$. The skills performed by each group were very similar, although the enrolled nurse entry group appeared to use observational skills for vision, hearing and mobility assessment more frequently.

What are the perceived barriers to student nurses' use of physical assessment skills?

Of the perceived barriers to physical assessment, students rated the influence of specialty area (M = 3.42, SD = 0.83) and lack of confidence (M = 3.30, SD = 0.98) highest, followed by lack of nursing role models (M = 2.92, SD = 0.79), ward culture (M = 2.84, SD = 0.70) and lack of time and interruptions (M = 2.83, SD = 0.87). Reliance on others and technology (M = 2.31, SD = 0.67) and perceived lack of influence on patient care (M = 2.20, SD = 0.85) scored lowest. Correlations showed that greater perceived lack of confidence, r = -.31, $p < .001$, lack of influence on patient care, r = -.26, $p < .001$, and lack of nursing role models, r = -.20, $p = .005$, were associated with lower core skill utilization.

When associations between student characteristics and perceived barriers to use of physical assessment were examined, the 3-year degree cohort had a greater lack of confidence (M = 3.45, 95% CI = 3.27, 3.62) compared to the 2-year enrolled nurse entry

students (M = 2.76, 95% CI = 2.36, 3.16), $F(2, 192) = 5.16$, $p = .007$. Lack of confidence scores also tended to decrease with age, $r = -.26$, $p < .001$.

Nursing work and nursing knowledge as barriers to physical assessment

Of the total number of respondents, 50 addressed the open-ended question about barriers to physical assessment. This qualitative component provided insight into the context of nursing practice and prevailing values. Physical assessment conducted by nurses assumes some autonomy in practice. Yet, of significance was the perception that nursing work was organized around an entrenched hierarchy that continued to position nurses as subordinate to medicine.

> *Every assessment that nurses do must be reviewed by a doctor or allied health team anyhow so I often think there is not much point in doing a physical assessment. We can learn to read and interpret ECGs, but the doctor must also review it … Nurses can do a mobility assessment, but then the physio will come and re-assess the patient anyhow ... I don't think our contribution is valued by medical and allied health staff as they do their own assessments.* (R121)

> *There is a culture in the department that 'why should a nurse do such an in-depth assessment when the doctor is going to do the same thing 5 minutes later.'* (R60)

The university and work contexts were also considered important in shaping the physical assessment practices of nurses. Participants perceived that the cultures of both institutions de-emphasized the importance of nursing physical assessment.

> *As a student there have been many skills of physical assessment that have been 'brushed over' during the degree that need more time to learn, practice and implement. And on placement our buddy nurses are often too busy getting the work done … until we are left to be responsible for patients and then we don't have the support to develop these physical assessment skills.* (R119)

> *Not enough practice at uni and practical teaching of these skills on placement. In general I also don't see that many nurses using these skills so I am not in the habit of developing these skills as a priority.* (R189)

The interrelated barriers of ward culture and lack of nursing role models were prominent reasons why skills were not performed during placements.

> *As a student on prac, I don't feel I have witnessed or been encouraged to perform physical assessment outside the ones you can see with your eyes.* (R122)

> *I have never had the opportunity to perform a physical assessment … neither has a nurse on placement asked me if I wanted to perform a physical assessment. It has never been taught in a lab session at uni. I was only ever told about it in a lecture in first semester in first year.* (R211)

Despite the above, however, physical assessment skills were valued.

> *I see physical assessment as a very important nursing skill, but feel that it is not taught to the extent that it should be.* (R155)

> *I would love to be able to competently utilize a wide range of physical assessment skills on the ward, however, I never really learnt them in the first place. One rushed unit of study at the commencement of my degree simply wasn't enough …* (R234)

The combination of the analytical findings addressed above point to a range of factors that shape the education and practice of physical assessment in nursing.

DISCUSSION

The study results suggest a more complex scenario than the redundant nursing assessment skill argument put by authors such as Giddens (2007). Those who support teaching fewer physical assessment skills point to a content saturated nursing curriculum (Tanner, 2010) and a disjuncture between education and practice in skill assessment (Giddens & Eddy, 2009). In this literature and where there is evidence that assessment skills are not

being used by nurses in practice, it is assumed that such skills are not needed and should therefore be removed from curricula. In the words of Giddens (2007, p. 87), "the focus of nursing education should reflect nursing practice."

Significantly our study found that, according to final-semester nursing students, 70% of skills were not learned or performed across the university and clinical settings. Of these, 42% of skills were learned but not practiced. Where students used physical assessment a typology existed whereby the most often applied skills were those related to observation and inspection. Furthermore, when asked about perceived barriers to physical assessment practice students referred to lack of confidence, doubt about the impact on patient care and the absence of role models. Lack of confidence correlated with lower use of physical assessment skills and the absence of a role model was interrelated to ward culture.

Given the findings above, it could be argued that nursing physical assessment sits at the margins in both education and practice. That nursing students do not have the opportunity to develop and practice assessment skills during their education may help explain a lack of application in practice. More broadly, however, rather than indicate what nurses need to practice, the small number of skills learned and used by nursing students could reflect a restricted or diminishing nursing skill base. Indeed, following the logic of previous authors, we are left wondering if other areas of nursing practice could be targets for removal from the undergraduate curriculum. Based on our findings, we might abandon the chest assessment and assessment of fluid balance and mobility as core nursing skills. And as more and more nursing skills are reframed as advanced practice, it may be that patient assessment disappears from entry-level RN practice.

It could also be argued that graduate nurses with a foundation in basic physical assessment skills should be capable of learning and applying additional skills within their specialty area (e.g., Secrest *et al*., 2005; Giddens & Eddy, 2009; Zambas, 2010). Yet, while

prospective studies are lacking, the assumption that nurses' use of and skill level in physical assessment will increase with experience is not well supported by evidence. For example, Barbarito *et al*. (1997) found that the use of physical assessment skills did not change as nursing students progressed through an undergraduate program. Other studies that report comparisons based on nursing experience or level of education have not found significant associations (Brown *et al*., 1987; Sony, 1992; Schroyen *et al*., 2005; Giddens, 2006). Comparatively more research has examined the influence of education and experience on the use of physical assessment skills among medical students. Interestingly, the medical literature suggests that the use and accuracy of physical assessment skills does not improve after graduation (Lok *et al*., 1998; Willett *et al*., 2007; Wu *et al*., 2007) and may in fact decline during training and with years of experience (Lee *et al*., 1998; Vukanovic-Criley *et al*., 2006).

It is worth recalling that physical assessment was an important component of the professionalization agenda in nursing during the last decades of the 20th century (Lesa & Dixon, 2007). The promise of this agenda was to expand the jurisdiction of and control over nursing practice by redefining nursing work. Yet, where nursing work has significantly restructured, the voice of nursing has been subdued. External factors have brought about a greater differentiation in nurse work activity, referred to as 'changing skill mix,' where the functions of nursing work have been redistributed across a range of staff with varying qualifications. This trend has been accompanied, at least in Australia, by the increased casualisation of the nursing workforce (Australian Bureau of Statistics, 2013). It is worth noting that a receding skills base is compatible with a work environment where nursing practice is poorly defined. The combination of multi-skilling and greater labour flexibility thus points to a broader contextual frame for understanding the role of physical assessment in nursing work.

We also argue that the clinical implications of our findings are troubling and reflect growing concern about final-semester nursing students' failure to identify patients at risk of clinical deterioration (Cooper *et al*., 2010; Endacott *et al*., 2010; Perkins & Kisiel, 2013). Monitoring for signs of clinical improvement or deterioration are vital skills that need to be developed through nursing education. Although rarely performed by nursing students in this study, body systems assessment beyond vital signs such as chest auscultation, abdominal examination or general neurologic assessment are core skills that should be routinely performed on every hospitalized patient. Hospital safety initiatives, such as early warning score systems, do not assist students to develop effective patient assessment and decision-making skills (McCallum *et al*., 2013; Perkins & Kisiel, 2013). Indeed, it could be asserted that the current hospital safety agenda has redirected nursing practice towards collection and reporting of minimal data to detect end stages of clinical deterioration (Osborne *et al*., 2014). Giddens and Eddy (2009) rationalize that teaching fewer skills will allow a greater emphasis on the interpretation of physical assessment findings and development of clinical judgment in undergraduate programs. But if student nurses at the point of graduation are inadequately prepared to conduct patient assessment, then no amount of critical thinking will lead to better clinical decisions.

Limitations

This study was conducted at a single Australian university which may limit the generalisability of the findings. Like previous research in this area, we relied on self-report measures which are vulnerable to recall bias. Although the survey included a single open-ended question only, these data were analytically useful and suggest further qualitative research in this area is warranted. Future research could extend to other components of nursing health assessment and further explore the process of how students translate this knowledge into practice.

CONCLUSION

Although RNs do the majority of patient assessment in healthcare, only a subset of physical assessment skills are used by nurses in everyday practice. This study has highlighted significant gaps in knowledge and skill utilization among graduating nurses which may, in part, explain current trends in practice. Change, however, would require a cultural shift in education and practice. To reclaim the nursing physical assessment as an essential competency of entry-level practice we need to ensure that future RNs value patient assessment and can demonstrate mastery of skills in the workplace.

Our findings shift the focus from the quantification of skills used in practice as the basis for curriculum reformation, to factors that underpin the education and practice (or lack thereof) of physical assessment by nurses. Judging the relevance of physical assessment skills on the basis of frequency of use alone ignores the importance of contextual factors that shape nurses' assessment practices. As such, we conclude and following Birks *et al*. (2013b) that the key question is not whether or not to teach physical assessment skills, but how such skills may be taught and practiced more effectively within a challenging nursing workplace.

Contributions

Study design: CD

Data collection and analysis: CD, CW, PL

Manuscript writing: CD, CW, PL

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TABLE

Table 1. Frequency of physical assessment skills used in clinical practice by final-semester nursing students (N = 208).

I perform this skill *regularly* or *frequently* (Median score = 5 or 4).	**I perform this skill *occasionally* or *rarely* (Median score = 3 or 2).**	**I *know how* to do this skill, but have *never* done this (Median score = 1)**	**I *do not know* how to do this skill (Median score = 0)**
Evaluate breathing effort (rate, patterns, chest expansion)	Inspect facial features	Evaluate olfactory nerve (CN I) with smell test	Estimate body fat by measuring triceps skin fold
Palpate and inspect capillary refill	Assess hearing based on conversation	Inspect internal nasal cavity with light source	Estimate muscle mass by measuring mid-arm muscle circumference
Palpate extremities for temperature	Inspect external eyes	Palpate maxillary sinuses	Transilluminate sinuses
Assess mental status/level of consciousness	Inspect chest shape	Palpate temporomandibular joint	Palpate teeth
Glasgow Coma Scale	Inspect muscles and extremities for size/symmetry	Palpate lips, tongue, mucous membranes of mouth	Assess hearing using finger rubbing test
Inspect overall skin colour/tone	Palpate extremities for tenderness	Inspect/palpate external ear	Assess hearing using Weber's test
Inspect skin lesions	Observe range of motion of joints	Inspect the internal ear with an otoscope	Assess hearing using Rinne test
Inspect wounds	Assess muscle strength	Assess hearing using whisper voice test	Assess hearing using an audiometer
Check pupils are equal and react to light	Auscultate abdomen for bowel sounds	Assess peripheral vision	Assess extraocular muscles (6 cardinal fields of gaze)
Palpate distal pulses for circulation	Inspect/examine stool	Inspect corneal light reflex	Observe a red reflex
Inspect/palpate extremities for oedema	Assess gait	Inspect anterior chamber of eye with ophthalmoscope or penlight	Perform internal eye exam with ophthalmoscope
Inspect extremities for skin colour/hair growth	Calculate BMI through measurement of height and weight	Palpate thyroid gland	Assess nerve root compression
Inspect abdomen	Inspect hair for colour, texture	Palpate the trachea	Measure range of motion of joints with goniometer
Evaluate speech	Inspect oral cavity	Palpate lymph glands in neck	Assess for carpal tunnel using Phalen's sign or Tinel's sign
Evaluate face for movement and sensation	Assess visual acuity	Palpate chest wall for vocal fremitus	Assess for rotator cuff damage
	Palpate chest wall for thoracic expansion	Percuss the lungs	Assess for knee effusion
	Auscultate lung sounds	Percuss for diaphragmatic excursion	Assess for knee stability (McMurray's test; Apley test; Thomas test)
	Auscultate chest for heart sounds	Auscultate the chest for vocal resonance	Percuss the abdomen to determine spleen size
	Inspect neck veins	Inspect the breasts	Percuss costovertebral angle for kidney tenderness
	Palpate joints for tenderness	Perform clinical breast examination	Assess abdominal reflexes by stroking abdomen
	Palpate abdomen for generalised tenderness, distension	Inspect spine	Assess abdomen for a floating mass
	Evaluate CN VII (raise eyebrows, wrinkle forehead, show teeth, puff out cheeks)	Palpate spine	Internal genitalia (vaginal examination) with speculum
	Sensation to light touch	Assess range of motion to back/spine	
		Inspect thorax for lifts/heaves of the heart	
		Palpate apical pulse or precordium (heart)	
		Percuss the chest over the	

		heart for heart borders Auscultate carotid artery Estimate (measure) jugular venous pressure Auscultate abdomen for vascular sounds Percuss the abdomen for abdominal tones Percuss the abdomen to determine liver span Palpate abdomen to assess for a mass Palpate the liver Palpate the spleen Palpate the kidneys Assess abdomen for fluid (shifting dullness/fluid wave) Inspection of female genitalia (hair distribution, vulva) Palpation of female genitalia Inspection of male genitalia (pubic hair, penis, scrotum) Palpation of male genitalia (penis, scrotum) Inspection of groin area Palpation for hernia Inspection of anus Test tongue for taste Test for gag reflex Test shoulders for muscle strength Assess patient ability to hop on one foot Assess patient ability to walk on heels/then toes Finger coordination (each finger touches thumb rapidly) Finger to nose test Sharp/dull sensation Vibratory sensation Position sense	Palpate uterus to measure fundal height (in pregnancy) Palpate fetal position (in pregnancy) External palpation of a uterus Bimanual palpation of uterus Palpation of cervix Transillumination of scrotum Palpation of anus for rectal tone Palpate anal canal and rectum for surface characteristics Palpate prostate Perform Romberg test Two-point discrimination Graphesthesia/stereognosis Evaluate deep tendon reflexes